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EXAMINER	
BOLDA, ERIC L	
ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,351	FRIEDRICH, LARS	
	Examiner	Art Unit	
	ERIC BOLDA	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. This is in response to Applicant's Remarks, filed March 28, 2008 made after final rejection. Because the rejection of claims 17 and 30 was unclear, a new Final Rejection is being made.

2. Applicant's argument **A** regarding the 35 USC 112 (1st para.) rejection of claims 1, 11, 13, and 15-33, have been considered but are not persuasive. Applicant argues (Remarks p. 2) that three definitions they have cited do not limit the term "amplified spontaneous emission " ASE to amplification in a gain medium with discrete levels. First, Applicant quotes (p.2, lines 20-22) from a glossary website (Encyclopedia of Laser Physics and Technology, RP Photonic Consulting GmbH) a definition of ASE. However, the Applicant has omitted the rest of the glossary entry. The Examiner finds the following text in the fourth paragraph of the entry "Even if amplified spontaneous emission in an amplifier is not strong enough to extract significant power, it can contribute significantly to the noise of the amplified signal. The noise figure of a laser amplifier can be considered to be limited by ASE. Note that for quasi-three-level gain media this ASE effect is stronger than for four-level media." Clearly, *quasi-three-level and four-level media* are gain media with discrete levels. Second, with regard to the definition from US Patent no. 7,317,741, (p. 3, lines 4-28) the cited paragraph clearly refers to inverted population, "ASE can deplete or reduce the inverted population that is available for stimulated emission" . Inverted population here means that an more atoms or ions are in an upper (high energy) state than a lower (low energy state): it can only be referring to a system with discrete levels.

Similarly, the US Patent No. 5,369,662 (p. 3, lines 31-36) recites "amplified fluorescence decrease the upper laser level population via stimulated emission"; the reference to an upper laser level indicates that a system of discrete levels is required for the ASE. Finally, with regard to Applicant's argument that the publication "Amplified Spontaneous Raman Scattering in Fiber Raman Amplifiers" is silent as to the meaning of the term ASE (p. 4, lines 11-15) , this is because the term is not relevant to the Raman amplification process. Consequently, the rejection is maintained.

3. Applicant's argument **B** (p. 5) regarding the 35 USC 112 (2nd para.) rejection of claims 1, 11, 13, and 15-33, have been considered and are persuasive. The rejection is withdrawn.

4. Applicant's argument **C** (p. 6, lines 8-14) regarding the rejection of claims 17 and 30 under Kamada and Large and further Aoki is considered. In the heading of the rejection , the claims were mistakenly included under the rejection over Kamada and Large (without Aoki) due to a typographical error; any inconvenience to Applicant is regretted. The rejection is corrected below.

5. Applicant's argument **D,** (p. 8, lines 10-20) regarding the rejection of claims 15,16, 18-29 and 31-33 over Kamada in view of Large is that there is no suggestion that modulating the excitation power in Kamada would improve the loss point detection technique employed in Kamada. Applicant points out that Kamada already identifies signals (Pm/ASS or ASS) at a determination of the excitation light power level Pjdg. In response, the identification of the level at which reflected light Pm/ASS reaches a

certain value does not in itself identify the light originating from the pump (34); the individual light signals that are scattered and reflected must still be detected first. Even assuming *arguendo* that Kamada were to identify the signals, there are other reasons to modulate the excitation power. Large teaches that modulation improves the detection of light at the signal wavelength (i. e. the wavelength of the ASS (scattered) light) (Abstract). Applicant further states that the excitation light in Kamada could not be modulated, since its power is increased at a fixed rate from zero. This is simply not true, as is well-known in signal processing: as long as the rate of increase is slow compared to the period of the modulation, such modulation may be imposed onto the signal. In conclusion applicants argument is not persuasive and the rejection is maintained.

6. Applicant's argument **E,** (p. 10, lines 4-21, p. 11 lines 1-10) regarding claims 28-33 is that the Examiner has not considered all claim terms because some of the language used in the claim suggest that it is a statements of intended or desired use. In particular, the Applicant argues that the limitation that the control unit is for "modulating the pump power of the optical signal generated by the pump source during a period in which the optical amplifier is started up" must be considered. In response, the Examiner notes that the function of the control unit was discussed on p. 5, 3rd paragraph. Therefore applicants argument is not persuasive. The reasons for combining the Kamada and Large references to obtain Applicant's functionality are reiterated below.

7. Applicant's argument **F,** (p. 11, lines 12-19) regarding claims 17 and 30 is that Aoki does not make up for the deficiencies of Kamada and Large. Since there are no deficiences, this argument is invalid. The rejection is maintained.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 15, 16, 18-29, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada (US 7,031,049) in view of Large (US 6,373,621).

With regard to claims 28-29, Kamada discloses discloses in Fig. 5 a Raman amplifier with

- A coupling unit (32) for coupling the pump power of an optical pump source (34) into an optical transmission line (30)
- a coupling unit (38) for decoupling the amplified spontaneous scattering (ASS) light fed back toward the pump of the amplifier
- a detector unit(48) detecting the decoupled ASS

- a control unit (44) controlling the pump source (34) and reception of the detector signal

Note: language such as "for coupling" " for decoupling", "for detecting" , "for modulating" and "for comparing" are essentially statements of intended or desired use in the apparatus claims 28-33. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference, as shown below. See MPEP § 2114.

The control unit takes a signal from the ASS detector (48) and compares it to a preset threshold value, generating an alarm (error) signal when the value falls below the threshold value (8^{th} col. lines 9-24). This operation occurs during during the start up period of the optical amplifier (6^{th} col. lines 59-67, 7^{th} col. lines 1-5). Kamada does not disclose that the controller modulates the pump power of the optical signal generated by the pump. However, Large teaches that in an apparatus for safer operation of Raman amplifiers, the pump power is modulated so that the ceasing of the pump signal can be detected based on a characteristic, e. g. sensitive to the phase of the modulation, indicating a break in the fiber line. A controller then reduces or shuts off the pumps. (6^{th} col. lines 24-43). It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the teaching of Large to modulate the pump power during the start up of the optical amplifier, in the apparatus of Kamada, for the advantage of providing unique identification of the signals. Further, modulation of the pump power would improve detection of the ASS and reflected light (Large, Abstract). Note that, in Raman amplification, modulation of the pump will result in modulation of an ASS signal.

With regard to claim 31, the coupler (32) is a band separation coupler (i. e. wavelength dependent), configured to pass substantially all the signal light along the transmission fiber (5th col. lines 9-16).

With regard to claim 32-33, the coupler (40) decoupling the ASS signal is wavelength independent (couples both the signal and ASS light) (7th col. lines 39-42).

With regard to claim 15, the steps of the method are merely the normal operation of the apparatus of Kamada, as modified by Large, with the error signal being generated to reduce or shut down the pump. Specifically, Kamada disclose the normal method of operating the Raman amplifier of Fig. 5, including monitoring the transmission line (30), generating an optical pump signal at (34) and coupling the optical pump source into the transmission line (30), feeding back the resulting ASS light and detecting the power of that light at (48), and generating an alarm (error) signal when the power of the detected ASS signal falls below a preset threshold value (5th col. lines 5-40 and 8th col. lines 9-24). Large teaches (Abstract) that in an apparatus for safer operation of Raman amplifiers, the pump power is modulated so that the ceasing of the pump signal can be detected based on a characteristic, e. g. sensitive to the phase of the modulation, indicating a break in the fiber line. It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the teaching of Large to modulate the pump power during the start up of the optical amplifier, in the apparatus of Kamada, for the advantage of providing unique identification of the signals. Further, modulation of the pump power would improve detection of the ASS and reflected light (Large, Abstract).

Note that, in Raman amplification, modulation of the pump will result in modulation of an ASS signal.

With regard to claim 16, when the alarm (error) signal is activated the pump light is deactivated (Kamada, 8th col. lines 16-17).

With regard to claims 18-22, the pump power is increased from an initial power level to a final power level, while the ASS signal is detected (Kamada, 6th col. lines 39-48).

With regard to claim 23-24, the pump power is modulated and the average is below a certain limit (Large).

With regard to claim 25, the pump light is coupled into the optical transmission line in the opposite direction of the signal light (Kamada, Fig. 5).

With regard to claim 26-27, the threshold value of the ASS power is determined in a calibration process (Kamada, 6th col. lines 39-48).

10. Claims 17 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada in view of Large as applied to claims 15 and 28 above, and further in view of Aoki et al. (US 6,879,434). Kamada in view of Large disclose all the elements of the claim except that error signal generates an error message. However, Aoki teaches an optical network in which operation includes error information from various optical nodes being collected to produce error messages (e. g. to indicate a failed fiber coupler) (10th col. lines 40-44). It would have been obvious to one skilled in the art (e. g. an optical engineer) to include a step of generating an error message from the alarm signal of Kamada, for the purpose of alerting the operator to replace the faulty fiber or coupler.

Note that the citations made herein are done so for the convenience of the applicant; they are in no way intended to be limiting. The prior art should be considered in its entirety.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Eric Bolda/

Examiner, Art Unit 3663